AMENDMENTS TO THE CLAIMS

The following Listing of Claims, with amendment to claims 12, 32 and 50, will replace all prior versions, and listings, of claims in the application. ***No new matter is introduced as a result of the following claim amendments.***

Listing of Claims:

1 (Previously Presented). A computer-readable storage medium having computer executable instructions for automatically encoding an input signal, said computer executable instructions comprising:

decomposing an input signal into constituent components;

encoding the constituent components into individual bitstreams with corresponding decoder pointers being generated as a part of the encoding;

multiplexing the individual bitstreams into a combined bitstream, with synchronization of the multiplexing being controlled by the decoder pointers generated during the encoding of the constituent components; and

automatically creating a companion bitstream separate from the combined bitstream, said companion bitstream including information elements for reshaping the combined bitstream.

2 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein encoding the constituent components into individual bitstreams comprises a multi-level hierarchical encoding of the constituent components and decoder pointers to create a mega bitstream.

3 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 2 wherein the decoder pointer for each coding pass of the multi-level hierarchical encoding is recorded as the position of the mega bitstream after all constituent components of each coding pass have been multiplexed.

4 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 3 further comprising multiplexing a plurality of mega bitstreams using decoder pointers for each coding pass of the mega bitstreams to synchronize the multiplexing of the mega bitstreams.

5 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein the input signal is an image, and wherein decomposing the input signal into constituent components comprises:

color decomposing the image into gray (Y) and color(U,V) components;

wavelet transforming each component image into wavelet subband; and

forming constituent components as transformed code blocks of a rectangular area of coefficients within a subband.

6 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 5 wherein encoding the constituent components into individual bitstreams comprises:

multiplexing transformed code blocks within a same resolution level into a resolution mega bitstream with corresponding decoder pointers;

multiplexing all resolution mega bitstreams into any of gray and color mega bitstreams using only the decoder pointers of the resolution mega bitstreams; and

multiplexing any gray and color mega bitstreams together to form a final master bitstream representing a compressed copy of the image.

7 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein the input signal is a stereo audio signal, and wherein decomposing the input signal into constituent components comprises:

decomposing the stereo channels into L+R and L-R channels;

applying a modulated lapped transform (MLT) to each channel for decomposing each channel into a number of MLT coefficients; and

grouping a set number of MLT coefficients to create constituent components.

8 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein the input signal is an audio signal having one or more channels.

9 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein the input signal is an image signal.

10 (Withdrawn - Previously Presented). The computer-readable storage medium of claim 1 wherein the input signal is a combined audio-video signal.

11 (Cancelled).

12 (Currently Amended). The computer-readable storage medium of claim 1 wherein the combined bitstream is decodable without ~~the use of~~ using the companion bitstream.

13 (Previously Presented). The computer-readable storage medium of claim 1 wherein the companion bitstream includes information elements for defining any of decoding quality, resolution, bitrate, and region of interest of the combined bitstream.

14 (Previously Presented). The computer-readable storage medium of claim 13 wherein at least one of the information elements is discarded where data represented by that information element is not to be encoded into a reshaped version of the combined bitstream.

15 (Previously Presented). The computer-readable storage medium of claim 1 further comprising decoding the combined bitstream, recording the decoder pointers of the constituent components during decoding of the combined bitstream, and constructing a companion bitstream from the decoded bitstream and decoder points.

16 (Previously Presented). The computer-readable storage medium of claim 1 wherein encoding the constituent components into individual bitstreams further comprises encoding

the constituent components using interblock correlations to increase encoding compression efficiency.

17 (Previously Presented). The computer-readable storage medium of claim 1 wherein encoding the constituent components into individual bitstreams with corresponding decoder pointers being generated as a part of the encoding is accomplished using an entropy coder having modified coding passes for outputting decoder pointers at the end of each coding pass.

18 (Previously Presented). The computer-readable storage medium of claim 17 wherein the entropy coder is an arithmetic coder.

19 (Previously Presented). The computer-readable storage medium of claim 17 wherein the entropy coder is a run-length coder.

20 (Previously Presented). The computer-readable storage medium of claim 1 further comprising creating a lead bitstream to record correlated information of the constituent components and information that controls a coding pass of each constituent component.

21 (Previously Presented). The computer-readable storage medium of claim 20 wherein the lead bitstream is multiplexed with the individual bitstreams into the combined bitstream.

22 (Previously Presented). A system for multiplexing bitstreams, comprising:

entropy encoding at least one set of code blocks comprising transform coefficients while determining first decoding pointers at the end of each coding pass, thereby producing an encoded coefficient bitstream for each set of code blocks;

multiplexing each encoded coefficient bitstream into a combined bitstream using the first decoding pointers for synchronizing multiplexing of the encoded coefficient bitstreams; and

automatically creating a companion bitstream separate from the combined bitstream, said companion bitstream including information for reshaping the combined bitstream.

23 (Withdrawn). The system of claim 22 wherein an input signal is an image, and wherein the input signal is decomposed into image components, including gray (Y) and color(U,V) components, said image components then being transformed to create the transform coefficients.

24 (Withdrawn). The system of claim 23 wherein transforming the image components to create transform coefficients comprises:

wavelet transforming each image component into wavelet subbands; and

forming the code blocks as blocks of a rectangular area of transform coefficients within each subband.

25 (Withdrawn). The system of claim 24 wherein entropy encoding the code blocks comprises:

multiplexing the code blocks within a same resolution level into a resolution mega bitstream with corresponding decoder pointers;

multiplexing all resolution mega bitstreams into any of gray and color mega bitstreams using only the decoder pointers of the resolution mega bitstreams; and

multiplexing any gray and color mega bitstreams together to form a final master bitstream representing a compressed copy of the image.

26 (Withdrawn). The system of claim 22 wherein an input signal is a stereo audio signal, and wherein the input signal is decomposed into audio components, including L+R and L-R audio channels, said audio components then being transformed to create the transform coefficients.

27 (Withdrawn). The system of claim 26 wherein transforming the audio components to create transform coefficients comprises:

applying a modulated lapped transform (MLT) to each audio component for decomposing each channel into a number of transform coefficients; and

forming the code blocks by grouping a predetermined number of MLT coefficients for each transformed audio component.

28 (Withdrawn). The system of claim 22 wherein the input signal is an audio signal having one or more channels.

29 (Withdrawn). The system of claim 22 wherein the input signal is an image signal.

30 (Withdrawn). The system of claim 22 wherein the input signal is a combined audio-video signal.

31 (Cancelled).

32 (Currently Amended). The system of claim 22 wherein the combined bitstream is decodable without ~~the use of~~ using the companion bitstream.

33 (Previously Presented). The system of claim 22 wherein the companion bitstream includes information elements for defining any of decoding quality, resolution, bitrate, and region of interest of the combined bitstream.

34 (Original). The system of claim 33 wherein at least one of the information elements is discarded where data represented by that information element is not to be encoded into a reshaped version of the combined bitstream.

35 (Original). The system of claim 22 further comprising decoding the combined bitstream, recording the decoder pointers of the constituent components during decoding of the combined bitstream, and constructing a companion bitstream from the decoded bitstream and decoder points.

36 (Original). The system of claim 22 wherein encoding the constituent components into individual bitstreams further comprises encoding the constituent components using interblock correlations to increase encoding compression efficiency.

37 (Original). The system of claim 22 wherein entropy encoding the code blocks while determining first decoding pointers at the end of each coding pass comprises using an entropy coder having modified coding passes for outputting decoder pointers at the end of each coding pass.

38 (Original). The system of claim 37 wherein the entropy coder is an arithmetic coder.

39 (Original). The system of claim 37 wherein the entropy coder is a run-length coder.

40 (Original). The system of claim 22 further comprising creating a lead bitstream during the entropy coding to record correlated information of the code blocks and information that controls a coding pass of each code block.

41 (Original). The system of claim 40 wherein the lead bitstream is multiplexed with the encoded coefficient bitstreams into the combined bitstream.

42 (Previously Presented). A computer-implemented process for multiplexing bitstreams, comprising using a computer to:

generate a set of decoder pointers by recording decoding points at an end of each coding pass when entropy encoding sets of transform coefficients to generate an encoded bitstream from each set of transform coefficients;

synchronize multiplexing of all of the encoded bitstreams into a master bitstream using the set of decoder pointers to control a multiplexing order of segments from the encoded bitstreams; and

automatically creating a companion bitstream separate from the master bitstream, said companion bitstream including information for reshaping the master bitstream.

43 (Withdrawn). The computer-implemented process of claim 42 wherein the input signal is an image signal.

44 (Withdrawn). The computer-implemented process of claim 43 further comprising:
decomposing the input signal into image components, including gray (Y) and color(U,V) components;

transforming the image components are by applying wavelet transforms to each image component for generating wavelet subbands; and

forming the sets of transform coefficients as blocks of a rectangular area of transform coefficients within each subband.

45 (Withdrawn). The system of claim 44 wherein entropy encoding the sets of transform coefficients comprises:

multiplexing each set of transform coefficients within a same resolution level into a resolution mega bitstream with corresponding decoder pointers;

multiplexing all resolution mega bitstreams into any of gray and color mega bitstreams using only the decoder pointers of each resolution mega bitstream; and

multiplexing any gray and color mega bitstreams together to form a final master bitstream representing a compressed copy of the image.

46 (Withdrawn). The computer-implemented process of claim 42 wherein the input signal is an audio signal having one or more channels.

47 (Withdrawn). The system of claim 46 wherein the audio signal is a stereo audio signal, and further comprising:

decomposing the stereo audio signal into audio components, including L+R and L-R audio channels;

transforming the audio components by applying a modulated lapped transform (MLT) to each audio component for creating a number of MLT transform coefficients for each channel; and

forming the sets of transform coefficients by grouping a predetermined number of MLT coefficients for each transformed audio component.

48 (Withdrawn). The computer-implemented process of claim 42 wherein the input signal is a combined audio-video signal.

49 (Cancelled)

50 (Currently Amended). The computer-implemented process of claim 42 wherein the master bitstream is decodable without ~~the use of~~ using the companion bitstream.

51 (Previously Presented). The computer-implemented process of claim 42 wherein the companion bitstream includes information elements for defining any of decoding quality, resolution, bitrate, and region of interest of the master bitstream.

52 (Original). The computer-implemented process of claim 51 wherein at least one of the information elements is discarded where data represented by that information element is not to be encoded into a reshaped version of the master bitstream.

53 (Original). The computer-implemented process of claim 42 further comprising decoding the combined bitstream, recording the decoder pointers of the constituent components during decoding of the combined bitstream, and constructing a companion bitstream from the decoded bitstream and decoder points.

54 (Original). The computer-implemented process of claim 42 wherein encoding the constituent components into individual bitstreams further comprises encoding the constituent components using interblock correlations to increase encoding compression efficiency.

55 (Original). The computer-implemented process of claim 42 wherein generating the set of decoder pointers by recording decoding points is accomplished by using an entropy

coder having modified coding passes for outputting decoder pointers at the end of each coding pass.

56 (Original). The computer-implemented process of claim 55 wherein the entropy coder is an arithmetic coder.

57 (Original). The computer-implemented process of claim 55 wherein the entropy coder is a run-length coder.

58 (Original). The computer-implemented process of claim 42 further comprising:

creating a lead bitstream during the entropy coding to record correlated information of the sets of transform coefficients and information that controls a coding pass of each set of transform coefficients; and

multiplexing the lead bitstream with the encoded bitstreams to create the master bitstream.

59 (Previously Presented). A system for encoding one or more signals, comprising:

decomposing an input signal into individual signal components;

transforming the individual signal components to produce a plurality of sets of transform coefficients for the signal, each set of transform coefficients corresponding to the individual signal components;

separately entropy encoding each set of transform coefficients to produce a component bitstream for each set of transform coefficients, while simultaneously recording a decoder pointer at an end of each coding pass of the entropy coding for each set of transform coefficients;

multiplexing each of the component bitstreams into a master bitstream by using the decoder pointers to synchronize the multiplexing of the component bitstreams; and

creating a companion bitstream separate from the master bitstream, as a part of the multiplexing process, said companion bitstream including information for reshaping the master bitstream.

60 (Cancelled).

61 (Previously Presented). The system of claim 59 wherein the companion bitstream includes information elements for defining any of decoding quality, resolution, bitrate, and region of interest of the master bitstream.

62 (Original). The system of claim 61 wherein at least one of the information elements is discarded where data represented by that information element is not to be encoded into a reshaped version of the combined bitstream.

63 (Withdrawn). The system of claim 59 wherein the input signal is any of an audio file comprising one or more audio channels, a video file comprising one or more images, and a combined audio-video file comprising one or more audio channels and one or more images.

64 (Original). The system of claim 59 further comprising decoding the master bitstream, recording the decoder pointers of the sets of transform coefficients during decoding of the combined bitstream, and constructing a companion bitstream from the decoded bitstream and decoder points.

65 (Original). The system of claim 59 wherein encoding the sets of transform coefficients into component bitstreams further comprises encoding the sets of transform coefficients while using interblock correlations to increase encoding compression efficiency.

66 (Original). The system of claim 59 wherein entropy encoding each set of transform coefficients while simultaneously recording a decoder pointer at an end of each coding pass comprises using an entropy coder having modified coding passes for outputting decoder pointers at the end of each coding pass, and wherein the entropy coder is any of an arithmetic coder and a run-length coder.

67 (Withdrawn). A system for decoding one or more multiplexed signals, comprising:

receiving an multiplexed signal, said signal comprising two or more multiplexed signal components;

providing a separate entropy decoder corresponding to each signal component;

sequentially selecting each signal component of the multiplexed signal as a current signal component, and for each current signal component, channeling bitstream segments of the multiplexed signal corresponding to the current signal component to a corresponding entropy decoder; and

for each current signal component, decoding the current signal component to an end of a current coding pass using the corresponding entropy decoder to produce a signal component bitstream for each of the signal components.

68 (Withdrawn). The system of claim 67 further comprising inverse transforming one or more of the signal component bitstreams to generate a decoded signal.

69 (Withdrawn). The system of claim 68 wherein the decoded signal is any of an audio file comprising one or more audio channels, a video file comprising one or more images, and a combined audio-video file comprising one or more audio channels and one or more images.

70 (Withdrawn). The system of claim 67 wherein the multiplexed signal further comprises a lead bitstream, said lead bitstream identifying a number of coding passes associated with each multiplexed signal component.

71 (Withdrawn). The system of claim 67 further comprising a sweeping pass for each signal component, said sweeping pass being applied to each signal component after an end of the multiplexed signal has been reached.

72 (Withdrawn). The system of claim 67 further comprising recording decoder pointers for each current signal component while decoding the current signal component.

73 (Withdrawn). The system of claim 72 further comprising constructing a companion bitstream from the decoded signal component bitstreams for each of the signal components and the decoder pointers, said companion bitstream including information elements for reshaping the multiplexed bitstream.

74 (Withdrawn). A computer-implemented process for decoding a multiplexed bitstream, comprising:

initializing a block of parallel decoders, said block of decoders including a number of entropy decoders equal in number, and having a one-to-one correspondence, to a number of signal component coefficient bitstreams representing coefficient code blocks embedded in the multiplexed bitstream; and

for each segment of the multiplexed bitstream, simultaneously decoding and demultiplexing the multiplexed bitstream by sequentially channeling the multiplexed bitstream to the corresponding decoder to decode the current coding pass of the bitstream; and

combining all the corresponding coding passes of the code block pieces to generate a plurality of decoded code block bitstreams, each code block bitstream representing a signal component.

75 (Withdrawn). The computer implemented process of claim 74 further comprising inverse transforming one or more of the code block bitstreams to generate a decoded signal.

76 (Withdrawn). The computer implemented process of claim 75 wherein the decoded signal is any of an audio file comprising one or more audio channels, a video file comprising one or more images, and a combined audio-video file comprising one or more audio channels and one or more images.

77 (Withdrawn). The computer implemented process of claim 74 further comprising:

a lead bitstream included in the multiplexed bitstream, said lead bitstream defining a number of coding passes used for encoding each code block bitstream;

decoding the lead bitstream using a tagtree decoder, said tagtree decoder being included in the block of parallel decoders; and

for each coding pass, skipping particular entropy coders where the number of coding passes defined by the lead bitstream for encoding each code block bitstream indicates that a corresponding code block did not have a coding pass for the current coding pass.

78 (Withdrawn). The computer implemented process of claim 74 further comprising a sweeping pass for each signal component, said sweeping pass being applied to each signal component after an end of the multiplexed signal has been reached.